



RIVERBANK CONDITION

This indicator monitors the condition of the riverbank along the Merced River in Yosemite Valley by observing several parameters, such as: vegetation coverage, presence of bare ground, and rate of bank retreat. During the last two field seasons, 2009 & 2010, Yosemite National Park social scientists have begun to estimate visitor use at a select number of riverbank study sites through “People at One Time” (PAOT) counts; results for this parameter are also found within in the “Extent of Visitor Use” indicator report.

Introduction

Riverbank condition has been selected as an indicator because the soils and vegetation that stabilize the banks of the river are essential to the integrity of riparian ecosystems (Figure 1). Although soil erosion occurs along the river as a result of natural river processes, such erosion can be exacerbated and accelerated by human activities (Kondolf et al., 1996). Increasing levels of visitor use on susceptible substrates often results in increased soil erosion; therefore, this is an important indicator for assessing a site’s ability to sustain varying types and levels of visitor use. Riverside soils and vegetation also affect water quality by regulating the entry of: groundwater, surface runoff, nutrients, sediments and other particulates, and fine and coarse organic matter to rivers and streams. Accelerated erosion, associated with trampling and visitor access, can alter these processes, leading to changes in hydrology and water quality.

This indicator has been under development since 2006. Under current protocols, data has been collected since 2008 on vegetation plots, channel morphology cross-sections were recorded in 2008 and 2009, and PAOT counts were conducted at selected sites in 2009 and 2010. This report summarizes observations made from the 2010 field work and resulting analyses of these data (Table 1).

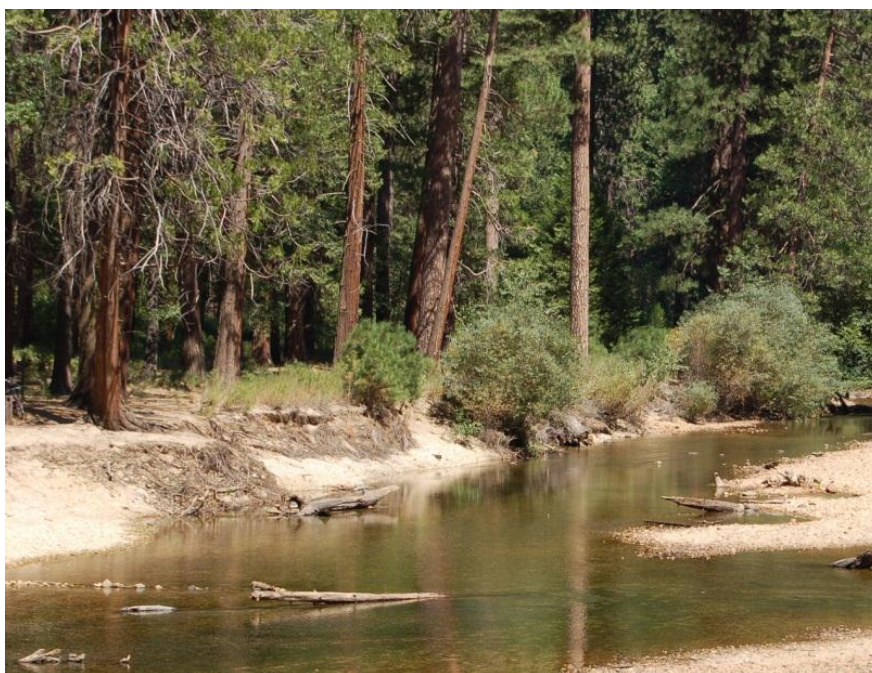




Figure 1 View of the Merced River in Yosemite Valley near Stoneman Bridge.

Findings and Highlights

Table 1 Riverbank Condition: Parameters, Plan/Application, Standard & Observed Condition

Parameter	Plan/Application	Standard	Observed Condition
Channel Morphology (Trend)	In development as a potential indicator for the Merced River corridor/ 28 sampling sites, four deliberately selected and 24 randomly selected, on the Merced River between Happy Isles and Pohono Bridge.	Standards for the Merced River channel morphology are currently being developed.	Data was collected in 2008 & 2009 and is scheduled for collection in 2011 & 2012. Trend data will be analyzed after repeat monitoring in 2013.
Vegetation Condition (Trend)	In development as a potential indicator for the Merced River corridor /28 sampling sites, four deliberately selected and 24 randomly selected, on the Merced River between Happy Isles and Pohono Bridge..	Standards for the Merced River corridor vegetation condition trend are currently being developed.	2010 data analyses in progress. Trend data to be analyzed after repeat monitoring in 2014
Vegetation Condition (Status)	In development as a potential indicator for the Merced River corridor / 28 sampling sites, four deliberately selected and 24 randomly selected, on the Merced River between Happy Isles and Pohono Bridge..	Standards for the Merced River corridor vegetation condition status are currently being developed.	2010 data analyses in progress.
Riverbank PAOT	In development as a potential indicator for the Merced River corridor /28 sampling sites, four deliberately selected and 24 randomly selected, on the Merced River between Happy Isles and Pohono Bridge.	Standards for the Merced River corridor people at one time are currently being developed.	Data analyses of the relationship between observed vegetation conditions and visitor use are in progress. The maximum number of PAOT observed was 36, but means ranged from a high of 4.91 to a low of 0.26. The overall mean was 2.38.

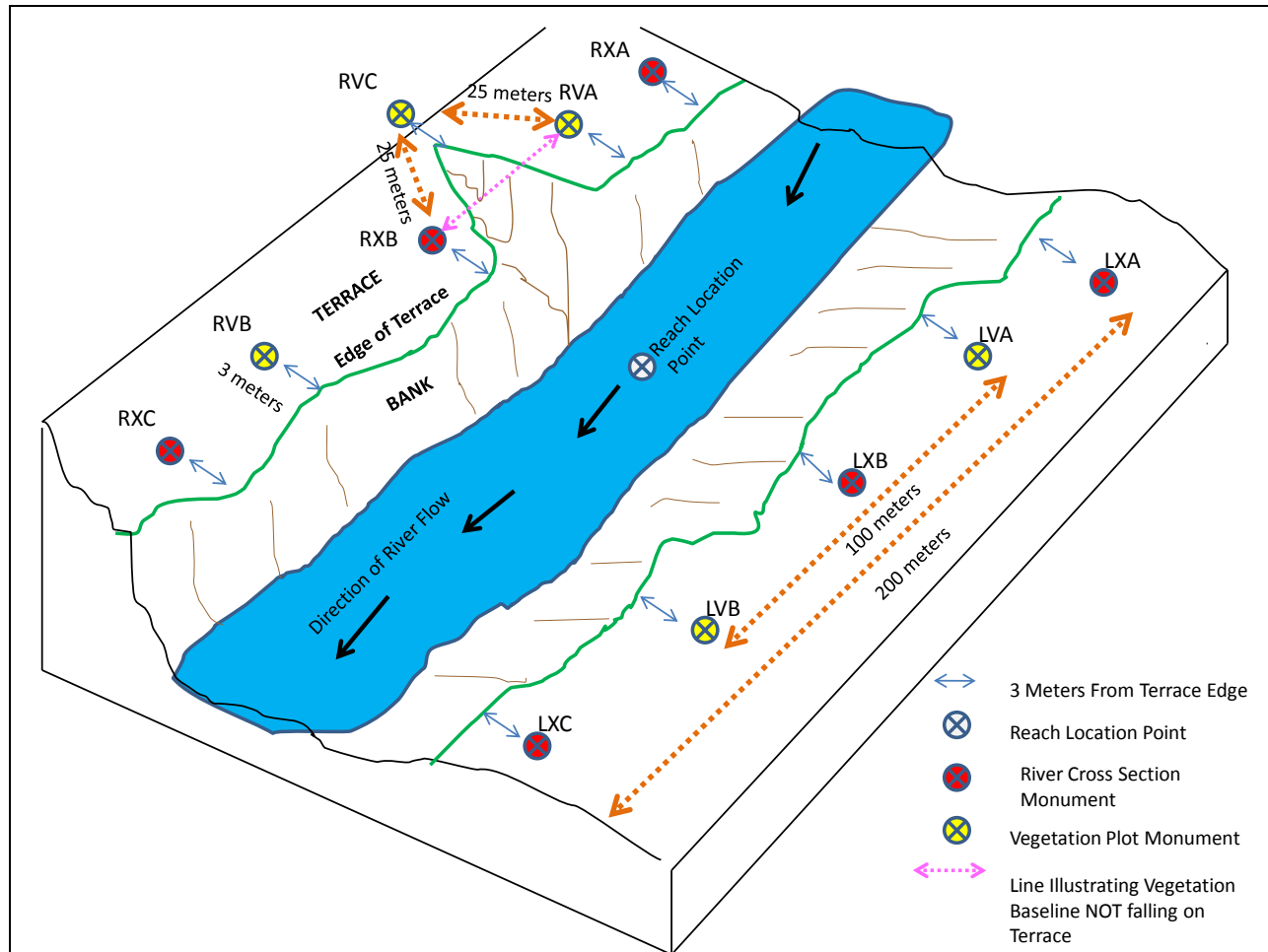


Figure 2 Sample Reach Cross-section & Vegetation Plot Setup.

Conclusion & Future Implications

2010 was a productive field season for this indicator; vegetation and ecological restoration staff worked to facilitate the repeatability of long-term monitoring by replacing monuments damaged by high water conditions earlier in the year. In addition, data collection at vegetation sites was streamlined to ensure the collection of a complete data set for the year. Currently, park managers are working with statisticians from the University of Idaho to analyze 2010 vegetation data and to further establish the sampling strategy and schedule in order to detect trends at all 28 sampling sites. PAOT counts were monitored at four riverbank study sites in 2010; this data is under analysis to help determine the relationships between levels of visitor use and the observed conditions of degradation to vegetation and soils. Future work, to be implemented in 2011, includes: the conduction of site surveys, GPS data collection, and permanent recording of monument locations. In 2011, data will be collected on additional variables including bird counts at sampling sites selected in the original GRTS design.